

Magnetic Dynamo Driven Strong XUV Emissions of Young dG-M Stars and Effects on Hosted Planets and Life

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The evolution of magnetic activity and the resulting XUV coronal & chromospheric emissions of dG-M stars with widely different ages are discussed. Young solar-type and cooler stars spin rapidly, resulting in robust magnetic dynamos and intense XUV emissions (as well as massive plasma outflows = winds). Over time these stars lose angular momentum via magnetized winds and their XUV emissions and winds significantly decrease. We discuss the XUV emissions of dG-M stars and the effects these emissions have on hosted planets. The strong XUV and plasma emissions of young Sun (inferred from young solar analogs) appear to have had major effects on the atmospheres and environments of its nearest planets ñ playing major roles in the loss of water on Venus and Mars. Also discussed are the effects strong XUV fluxes (and frequent flares) found for young dK & dM stars on possible hosted planets orbiting within their shrunken habitable zones ($0.05 < \text{HZ} < 0.6 \text{ AU}$). Dwarf M stars are important because they are very numerous and have long nuclear lifetimes; they have efficient dynamos that result in persisting XUV emissions and flares. Also, a significant number of dM stars are old ($>5 \text{ Gyr}$), presenting opportunities for the development of highly evolved forms of life on planets that may host them. Thus, dM stars will be natural targets for SETI and Darwin/TPF programs and characterizing their XUV irradiances, winds and flares over time is important to study their suitability as habitats for life.